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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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John A. Miller
Warn, Burgess & Hoffmann, P.C.
P.O. Box 70098
Rochester Hills, MI 48307

EXAMINER	
TRAN, LONG K	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/611,340	HATHAWAY ET AL.	
	Examiner	Art Unit	
	Long K. Tran	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-29 is/are rejected.

7)☒ Claim(s) 1,10,12-14,16,20,21,28 and 29 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 07/01/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on July 01, 2003.

The references cited on the PTO -1449 form have been considered.

Claim Objections

2. Claims **1, 10, 12, 13, 14, 16, 20, 21, 28** and **29** are objected to because of the following informalities:

Claims **1, 10, 12, 13,16, 20, 21, 28** and **29**: add -- electronic -- before "device";

Claim **14**: Line 3, change " late " to -- plate --;

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims **1, 5, 6, 9** and **12** is rejected under 35 U.S.C. 102(b) as being anticipated by Shenoy (US Patent No. 6,310,386).

Regarding claim **1**, Shenoy discloses: An electronic device, said assembly comprising:

a base plate 402 / 506, 504a, 508, 504b, 510 (fig.5A, col. 10, lines 6 11) including a top surface and a electronic device packaging assembly 310 (fig. 5A) for enclosing an bottom surface, said electronic device being mounted to the top surface of the base plate,

a plurality of electrical vias 408 / 508a, 508b, 510a, 510b (figs. 4A & 5B; col. 10, lines 25 – 50) extending through the base plate, electrical traces patterned 506a, 506b (figs. 5A & 506b) on the top surface of the base plate and being in electrical contact with the vias in a selective manner, said traces including ground traces, signal traces 506 (fig. 5A) and power traces 510 (fig. 5A), said signal traces including an impedance matching compensation network 24a, 24b (fig. 1B), said device being electrically coupled to the compensation networks to provide impedance matching between the device and the signal traces (col. 1, lines 59 – 64), and

a ball grid array 314 (fig. 5A) mounted to the bottom surface of the base plate, said ball grid array including a plurality of balls 314 (fig. 5A) electrically coupled to the vias in (col. 9, lines 25 – 28) selective manner to provide electrical connections to the device.

Regarding claims **5** and **6**, Shenoy et al. disclose the ball grid array includes ground balls, signal balls and power balls (column 9, lines 39 – 49).

Regarding claims **9** and **12**, Shenoy et al. disclose compensation network includes capacitors and inductors (figs. 1C, 1F and 2A; column 2, lines 12 +, column 6, lines 3 – 14).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims **4**, **7**, **8** and **13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoy (US Patent No. 6,310,386).

Regarding claim **4**, Shenoy et al. disclose the claimed invention of claim 1 except for the base plate has a thickness in the range of about 0.00" – 0.008".

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See*

also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Moreover, the thickness of the base plate has not been alleged by applicant to be of significant importance for patentability.

Regarding claim **7**, Shenoy et al. disclose the claimed invention of claims 1, 5 and 6 except for the ball pitch is 0.030".

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946);*

In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Moreover, the ball pitch has not been alleged by applicant to be of significant importance for patentability.

Regarding claim **8**, Shenoy et al. disclose the claimed invention of claim 1 except for the ball having diameter about 0.18".

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945);*

In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Moreover, the ball diameter has not been alleged by applicant to be of significant importance for patentability.

Regarding claim **13**, Shoney shows the device operates up to18 GHz (col. 7, lines 66 & 67; col. 8, lines 1 – 3).

7. Claims **2, 14** and **20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoy (US Patent No. 6,310,386) in view of Chang et al. (US Patent No. 5,191,174).

8. Regarding claim **2**, Shenoy discloses the claimed invention of claim 1 with laminate base except for the base plate included a fiber and resin mixture.

However, it is conventional and also taught by Chang et al. that dielectric layer 33 (fig. 1; col. 4, lines 35 – 44) between conductive planes is a known epoxy resin formula having glass fiber therein. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the base of Shenoy with the epoxy resin having glass as an insulated dielectric layer of Chang et al., in order to laminate the three conductive layers together for making a printed circuit board as a base for the semiconductor device.

Regarding claim **14**, Shenoy discloses: An electronic device, said assembly comprising:

a laminate base plate 402 / 506, 504a, 508, 504b, 510 (fig.5A, col. 10, lines 6 11) including a top surface;

a plurality of electrical vias 408 / 508a, 508b, 510a, 510b (figs. 4A & 5B; col. 10, lines 25 – 50) extending through the base plate;

electrical traces patterned 506a, 506b (figs. 5A & 506b) on the top surface of the base plate and being in electrical contact with the vias in a selective manner, said traces including ground traces, signal traces 506 (fig. 5A) and power traces 510 (fig. 5A);

an electronic device 310 (fig. 5A) mounted to the top surface of the base plate, said device being electrically coupled to the power traces and the signal traces.

Shenoy does not explicitly specify that the electronic device mounted on a ground trace.

However, It would have been obvious to one of ordinary skill in the art at the time the invention was made to mount the device on a ground trace (note: the base plate 110 will have a ground trace on top surface under the device), since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

In addition, Shenoy does not explicitly show the base plate including a fiber and resin mixture.

However, it is conventional and also taught by Chang et al. that dielectric layer 33 (fig. 1; col. 4, lines 35 – 44) between conductive planes is a known epoxy resin formula having glass fiber therein. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the base of Shenoy with the

epoxy resin having glass as an insulated dielectric layer of Chang et al., in order to laminate the three conductive layers together for making a printed circuit board as a base for the semiconductor device.

Furthermore, Shenoy does not explicitly show the base plate being less than 0.01".

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Moreover, the base plate thickness has not been alleged by applicant to be of significant importance for patentability.

Regarding claim **20**, Shoney shows the device operates up to18 GHz (col. 7, lines 66 & 67; col. 8, lines 1 – 3).

9. Claim **3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoy (US Patent No. 6,310,386) in view of Fenton et al. (US Patent Application Publication No. 2002/0145475).

10. Regarding claim **3**, Shenoy discloses the claimed invention of claim 1 with laminate base except for the base plate is made of a material from the group consisting of Rogers 4003 and a crystal polymer circuit board material.

Fenton shows a laminated structure including layers made of Rogers 4003 and layers of prepreg (dielectric) (Fig. 15; [0100]). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the base of Shenoy with a laminated structure including layers made of Rogers 4003 and layers of prepreg (dielectric) of Fenton et al., in order to yield a thermally stable rigid laminate with electrical properties suitable for a specific semiconductor device.

11. Claims **14, 16, 17** and **18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lau (US Patent No. 6,075,710).

12. Regarding claim **14**, Lau discloses an electronic device package assembly comprising:

a laminate base plate 110 (fig. 3) including a top surface and a bottom surface, said laminate base plate being made of a material including a fiber and resin mixture (fig. 2, FR-4 or BT epoxy; col. 5, lines 19 - 20) and being less than 0.01" thick (col. 4 lines 57+, col. 5 lines 11 – 61, and col. 8, lines 8 – 11);

a plurality of electrical vias 125 extending through the base plate;

electrical traces patterned (figs. 3C &3B) on the top surface of the base plate and being in electrical contact with the vias, said traces including ground traces, signal traces and power traces (col. 2, lines 20 – 23; and col. 6, line 67); and

an electronic device 105 (fig. 3) mounted to the top surface of the base plate, said device being electrically coupled to the power traces and the signal traces.

Lau does not explicitly specify that the electronic device mounted on a ground trace.

However, It would have been obvious to one of ordinary skill in the art at the time the invention was made to mount the device on a ground trace (note: the base plate 110 will have a ground trace on top surface under the device), since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Regarding claim **16**, Lau disclose ball grid array 45 (fig. 1) mounted to the bottom surface of the base plate, the ball grid array including a plurality of balls 45 (fig. 1) electrically coupled to the vias 40 (fig. 1), 125 (fig. 3B) and having a ball pitch; the solder ball 45 are arranged to have compatible configuration suitable conveniently connect to terminals (signals, power or ground) formed on the base plate (col. 2, lines 14 – 56).

Regarding claim **17**, Lau disclose the claimed invention of claims 14 and 16 except for the ball pitch are depopulated to make the signal ball coaxial with ground plane patterned.

However this limitation is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324,326(CCPA 1974); In re Marosi et al., 218 USPQ 289,292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Regarding claim **18**, Shenoy et al. disclose the claimed invention of claims 14 except for the ball pitch is 0.030" and ball's diameter is 0.18".

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be

expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Moreover, the ball pitch and ball's diameter have not been alleged by applicant to be of significant importance for patentability.

13. Claim **15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lau (US Patent No. 6,075,710) in view of Beigel US Patent Application Publication No. 2003/0169207).

14. Regarding claim **15**, Lau discloses the claimed invention of claim 14 except for the base plate is made of a material selected from the group consisting of Rogers 4003 and a crystal polymer circuit board material.

Beigel shows the high quality ceramic composition Rogers 4003 is compatible with FR4 for making base plate ([0028]).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to replace the FR4 material for base plate of Lau with the Roger 4003 material of Beigel, in order to prevent variations in dielectric constant and high frequencies loss when using FR4.

15. Claim **19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lau (US Patent No. 6,075,710) in view of Heckaman et al. (US Patent No. 5,023,624).

16. Regarding claim **19**, Lau discloses the claimed invention of claim 14 except for the signal traces include an impedance matching compensation network; the compensation network including a capacitance stub, an inductive stub to provide capacitive and inductive impedance matching that reduced parasitic losses.

Heckaman et al. disclose compensation network includes capacitors and inductors (figs. 4; column 5, lines 52 +, column 5, lines 1 – 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the compensation network of Heckaman into device of Lau, in order to prevent a substantial unwanted reactance on the transmission.

17. Claims **21, 23 – 27** and **29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoy (US Patent No. 6,310,386)

18. Regarding claim **21**, Shenoy discloses: An electronic device, said assembly comprising:

a base plate 402 / 506, 504a, 508, 504b, 510 (fig.5A, col. 10, lines 6 11) including a top surface and a electronic device packaging assembly 310 (fig. 5A) for enclosing an bottom surface;

a plurality of electrical vias 408 / 508a, 508b, 510a, 510b (figs. 4A & 5B; col. 10, lines 25 – 50) extending through the base plate, said traces including ground traces, signal traces 506 (fig. 5A) and power traces 510 (fig. 5A), where the signal traces are electrically coupled to signal vias, the power traces are electrically coupled to power vias and the ground traces are electrically coupled to ground vias, said signal traces including an impedance matching compensation network 24a, 24b (fig. 1B), said device being electrically coupled to the compensation networks to provide impedance matching between the device and the signal traces (col. 1, lines 59 – 64), and

a ball grid array 314 (fig. 5A) mounted to the bottom surface of the base plate, said ball grid array including a plurality of solder balls 314 (fig. 5A) being arranged by a certain ball pitch, said solder balls including power solder balls, signal solder balls and ground solder balls, said power solder balls being electrically coupled to power vias, said signal solder balls being electrically coupled to signal vias and said ground solder balls being electrically coupled to ground vias (col. 9, lines 25 – 28).

Shenoy does not explicitly show the base plate has a thickness of less than 0.01" thick.

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization

which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Regarding claim **23**, Shenoy discloses the claimed invention of claim 21 with laminate base except the base plate has a thickness in a range of about 0.005" – 0.008".

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction,**

depth, thickness, etc., or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Moreover, the thickness of the base plate has not been alleged by applicant to be of significant importance for patentability

Moreover, the thickness of the base plate has not been alleged by applicant to be of significant importance for patentability.

Regarding claim **24**, Shoney disclose the claimed invention of claim 21 except for the ball pitch are removed to make the signal solder ball coaxial with ground plane patterned.

However this limitation is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be

identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324,326(CCPA 1974); In re Marosi et al., 218 USPQ 289,292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Regarding claims **25** and **26**, Shenoy et al. disclose the claimed invention of claims 21 except for the ball pitch is 0.030" and ball's diameter is 0.18".

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.**, or in conbination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden

of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Moreover, the ball pitch and ball's diameter have not been alleged by applicant to be of significant importance for patentability.

Regarding claim **27**, Shenoy et al. disclose compensation network includes capacitors and inductors (figs. 1C, 1F and 2A; column 2, lines 12 +, column 6, lines 3 – 14).

Regarding claim **29**, Shoney shows the device operates up to18 GHz (col. 7, lines 66 & 67; col. 8, lines 1 – 3).

19. Claim **22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoy (US Patent No. 6,310,386) in view of Chang et al. (US Patent No. 5,191,174).

20. Regarding claim **22**, Shenoy discloses the claimed invention of claim 1 with laminate base except for the base plate being made of material selected from the group of a Rogers 4003, a crystal polymer circuit, and a fiber and resin mixture.

However, it is conventional and also taught by Chang et al. that dielectric layer 33 (fig. 1; col. 4, lines 35 – 44) between conductive planes is a known epoxy resin

formula having glass fiber therein. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the base of Shenoy with the epoxy resin having glass as an insulated dielectric layer of Chang et al., in order to laminate the three conductive layers together for making a printed circuit board as a base for the semiconductor device.

21. Claims **10, 11** and **28** is rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoy (US Patent No. 6,310,386) in view of Schildgen et al. (US Patent Application Publication No. 2004/0099958).

22. Regarding claim **10**, Shenoy discloses the claimed invention of claim 1 except for cover mounted to the top surface of the base plate to seal the device.

Schildgen et al. show a cover (lid) 150 (fig 1) mounted on the top surface of the base plate.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide a cover (lid) of Schildgen into device of Shenoy, in order to protect the device.

Regarding claim **11**, Schildgen et al. show cover (lid) 150 (fig. 1) being sealed to ring trace patterned around and outer periphery

Regarding claim **28**, Shenoy discloses the claimed invention of claim 21 except for cover mounted to the top surface of the base plate to seal the device.

Schildgen et al. show a cover (lid) 150 (fig 1) mounted on the top surface of the base plate.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide a lid cover of Schildgen into device of Shenoy, in order to protect the device.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long K. Tran whose telephone number is 571-272-1797. The examiner can normally be reached on Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Tran

December 17, 2004

MICHAEL TRAN
PRIMARY EXAMINER